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CHAPTER 5

SIZES OF THE DIFFERENT EFFECTS: COVERAGE, MODE AND NONRESPONSE

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5.1 Introduction

In chapter 1 it was mentioned that in this study attention will be given to the three main sources of differences in surveys: coverage differences, mode differences, and nonresponse or organisational differences. These differences which occur in any survey research can explain why results obtained for the Eurobarometer 41 by INRA using the face to face mode of data collection differ from those from a telephone survey carried out at about the same time by FORSA. The sum of these differences - the total differences - has been described in chapter 3 for a number of questions. In chapter 3 it was argued that the samples of the two studies were really different and that weighing on the basis of background variables did not improve the results for the variables of interest. The problem of coverage errors has been discussed in chapter 4. Coverage errors are due to a systematic error in the sample design caused by differences in telephone ownership; in the telephone books nonowners of telephones are not present. Therefore the use of telephone books as a sampling frame for surveys of general populations will lead to a systematic bias in the sample. Chapter 4 shows that the owners of telephones differ considerably in several aspects from the nonowners of telephones. Therefore, a systematic bias in the samples can be expected due to this factor.

A mode difference is the difference in response distributions produced by the special features of two different observation techniques. Chapters 6 to 9 will give lots of attention to this issue when comparing face to face and telephone interviews.

The nonresponse differences result from differences in sample designs and the fieldwork by survey organisations for instance in establishing contact with a household or in dealing with a refusal to co-operate in an interview on the part of the household. Each organisation has its own procedures of going about such problems which leads to specific nonresponse errors. These differences between organisations obviously can also lead to differences in results.

The purpose of the study reported in this chapter is to quantify the coverage difference (C), the mode difference (M), and the nonresponse (N) or organisational difference for different questions. The total difference (T) between face to face and telephone interviews can be decomposed into the three mentioned differences.

As shown in chapter 1, the corresponding equation is rather simple:

$$T = C + M + N \quad (1)$$

The total difference (T), the coverage difference (C) and the mode difference (M) can be estimated independently of each other. The remaining forth component, the nonresponse effect (N), can only be derived from them. The purpose of this chapter is to provide an estimate of these different components.

It should be clear from the outset that only differences are discussed and not biases or errors, let alone the bias of a specific mode or organisation. The data does not allow for such analyses except in the case of differences due to coverage errors. In face to face interviews people can be asked whether they have a telephone. If this is not the case, these people will drop out in telephone interviews. By comparing a full sample with the sample of telephone owners, one can study the bias caused by this coverage error. For the other two components only differences can be detected. Nonresponse differences are due to differences in fieldwork. Face to face interviewing may lead to more co-operation, but telephone interviewing has the advantage that the fieldwork can be better controlled and attempts of contacting a household can be cheaply repeated. Unfortunately, we cannot derive a measure of the quality of the fieldwork (N) for each research organisation separately. Only the differences in results can be presented.

The same holds for the mode effects: differences can be detected, but they permit no conclusion as to which mode is better. The consequence from the above conclusion is that the differences between the methods of data collection will be shown and these differences will be decomposed in the three mentioned components. This analysis will reveal which component is larger, but we will not be able to say which measure performs better.

In this study the estimation of the different components is restricted to those countries where panel data are available: France with a high telephone density, Belgium and Spain with a medium-sized density. 15 Variables with non-political and political, national and international references are examined. Variables of factual political knowledge (knowledge of date of European Parliament-Election) or behaviour (probability to vote) are skipped. This is because effects of learning or mobilisation during an election campaign can not be excluded which may affect the panel data. Besides the attitudinal variables, four demographic variables (possession of durable goods) are included. For an overview of all variables we refer to table 5.3 and for the formulation of these questions in the different studies we refer to Appendix 1.

The analysis starts with the estimation of the total differences, continues with the coverage errors, goes to the mode differences and finally derives the organisational differences. The presentation follows a simple format. To demonstrate the procedure of the calculation the “benefit” variable is selected because of its simple structure and its relevance in the Eurobarometer. In table 5.1 the percentages of each response category are shown for each country. In a second step (see table 5.2) the differences for each category between the face to face and the FORSA telephone survey are shown. From these differences, in table 5.3 an overall measure for the differences is presented. This measure is calculated for all variables analysed in this chapter. In the same way to the other analysis are presented.

5.2 Total difference

The estimation of the total differences between face to face and telephone data is based on the comparison between the Eurobarometer 41 and the FORSA telephone sample. Table 5.1 shows the distribution of answers for the variable "benefit" for the three countries which have been studied through the additional EB 41 panel component.

Table 5.1 The responses in percentages in face to face and telephone interviews carried out by two different organisations for the benefit variable

	France		Spain		Belgium	
	EB41.0	FORSA	EB41.0	FORSA	EB41.0	FORSA
Benefited	39.4	43.7	38.6	48.6	48.3	63.4
Not benefited	39.3	31.5	43.4	29.4	27.8	16.2
DK/ No answer	21.4	24.8	18.0	22.0	23.9	20.4
N	1034	501	1003	500	1081	500

This table shows that there are considerable differences between the face to face and the telephone study. Table 5.2 presents these differences in detail. To calculate the percentage point differences, the response from the face to face study are subtracted from the percentages of the telephone survey.

Table 5.2 Percentage differences between the face to face interviews and the telephone interviews for the "benefit" variable

	France	Spain	Belgium
Benefited	4.3	10.0	15.1
Not benefited	-7.7	-14.0	-11.6
DK/No answer	3.4	4.0	-3.5
Adjusted total difference	7.7	14.0	15.1

The absolute differences of single categories range from 3.4 to 15.1. Clearly, there are considerable discrepancies between these two measurements. In order to obtain an impression of the difference between the two modes of data collection, all differences ignoring the signs are summed up and devided by two. The resulting total differences between the two modes for France Spain and Belgium are: 7.7%, 14% and 15.1%. The same calculation has been done for all variables in this study, and the results are reported in table 5.3.

The resulting figures are of a quite considerable magnitude: 14 out of 45 differences are higher than 10 percentage points. These results again demonstrate very clearly that findings from studies using different modes of data collection can not be compared directly. In this case the data are collected at the same time and supposedly for the same populations. Nevertheless, in all three countries for at least some questions large differences have been found, also the standard Eurobarometer questions are effected.

In the next sections we will analyse where these large differences come from.

Table 5.3 Adjusted total differences for 15 variables in three countries

	France	Spain	Belgium
Satisfaction with life	10.9	21.9	4.6
Satisfaction with democracy	4.9	8.8	3.4
Persuade others	17.1	11.6	7.8
Political discussion	1.7	6.3	10.4
News on TV	6.6	3.8	3.8
News daily papers	7.8	8.1	6.9
News on radio	13.8	11.2	13.3
Interest in European politics	10.5	13.8	9.3
Level of EU informedness	8.4	11.1	11.0
Membership in EU	6.7	7.0	16.6
Benefit from EU membership	7.7	14.0	15.1
Colour TV	4.1	0.7	2.5
PC	0.2	7.4	8.4
Two or more cars	4.7	10.6	9.3
Second home	0.8	4.9	1.0
Mean	7.1	9.4	8.2

5.3 Coverage errors

In chapter 4 large differences between owners and nonowners of telephones are revealed. It was also found that especially in countries with a low telephone density the differences between owners and nonowners can be very large. Whereas when the group of nonowners is small, the coverage differences will likely be small as well.

In order to assess the coverage error, the question is asked: What are the percentage point differences between a sample drawn from telephone owners and nonowners and a sample drawn only from telephone owners? For all variables tables presenting these differences can be constructed on the basis of the data from the Eurobarometer 41 face to face study. In these tables the owners of telephones are compared with the complete sample of owners and nonowners. Table 5.4 is an example of such a table for the “benefit” question.

Table 5.4 Coverage errors estimated for the benefit variable in three countries

	France		Spain		Belgium	
	EB41.0	Telephone owners EB41.0	EB41.0	Telephone owners EB41.0	EB41.0	Telephone owners EB41.0
Benefited	39.4	39.3	38.6	39.1	48.3	50.7
Not Benefited	39.3	39.9	43.4	43.6	27.8	27.0
DK/No answer	21.4	20.8	18.0	17.3	23.9	22.3
N	1034	972	1003	793	1081	888

If there were no coverage errors, the percentage differences would have been zero or close to zero. This is clearly not the case, but on the other hand the differences in table 5.4 are much smaller than in table 5.1 for the total differences.

Table 5.5 shows the differences derived from table 5.4 These differences indicate the size of the coverage error for the variable "benefit" in three countries caused by the systematic bias originating from ignoring the people without a telephone.

Table 5.5 Differences* between full sample and sample of telephone owners for the "benefit" variable in three countries in EB41.0

	France	Spain	Belgium
Benefited	-0.1	0.5	2.4
Not benefited	0.6	0.2	-0.8
DK/No answer	-0.6	-0.7	-1.6
Adjusted total difference	0.6	0.7	2.4

*Because of rounding errors the sum of positive and negative values is not exactly zero in each column.

The "adjusted total difference" is calculated like in table 5.2, that is by summing up the differences ignoring the signs and deviding by two. This value gives a clear indication of the size of the coverage error.

Table 5.6 shows the estimates of the coverage error for all variables for the three countries.

The mean values show that the coverage error is larger in the two countries with a lower telephone density than in France, a country with a higher ownership. At first sight, this seems a bit surprising because it was shown in chapter 4 that often the nonowners of telephones in countries with a high telephone density are quite deviant. On second thought, it is apparent that the size of this group necessarily plays a more important role than the extent of the deviation between the group of owners and nonowners.

Besides this general effect a clear pattern does not exist. Neither are the demographic variables particularly deviant nor the involvement variables conspicuous. Scores are also very small, ranging from 0 to 3.4.

From these results the conclusion must be drawn that the coverage problem exists as a systematic error of telephone interviews, but it appears to produce only a very small bias for almost every question for the three countries studied here.

Table 5.6 Coverage error across 15 variables: the adjusted total differences

	France	Spain	Belgium
Satisfaction with life	0.3	0.9	1.4
Satisfaction with democracy	0.3	1.7	0.8
Persuade others	0.6	0.8	1.6
Political discussion	0.7	2.1	1.7
News on TV	0.9	1.1	0.7
News daily papers	0.6	3.4	1.4
News on radio	0.9	1.0	1.0
Interest in European politics	1.0	1.6	2.1
Level of EU informedness	0.7	1.4	0.7
Membership in EU	0.5	0.8	2.0
Benefit from EU membership	0.6	0.7	2.4
Colour TV	0	0.5	0.2
PC	0.5	1.5	2.4
Two or more cars	1.3	1.9	2.2
Second home	0.2	2.0	0.4
Mean	0.6	1.4	1.4

5.4 Mode differences

Mode effects should be visible if answers reported in the face to face interviews are compared with answers reported in the telephone interviews for the same people. Such data have been produced by the panel component of the Eurobarometer study for France, Spain and Belgium and for all three countries. Table 5.7 presents the distribution of answers to the "benefit" question of people interviewed firstly face to face and secondly by telephone in the panel.

Table 5.8 gives the percentage differences derived from table 5.7. The percentages from respondents interviewed face to face are subtracted from the percentages of the same respondents interviewed by telephone. Again an overall measure of mode effect has been calculated.

Table 5.7 The distribution of the answers for the "benefit" variable in three countries from two modes of interviewing in the EB41.Panel

	France EB41.Panel		Spain EB41.Panel		Belgium EB41.Panel	
	face to face	telephone	face to face	telephone	face to face	telephone
Benefited	39.0	39.3	38.2	42.5	51.5	53.3
Not Benefited	41.6	40.2	45.0	44.4	27.0	23.1
DK/No answer	19.4	20.4	16.8	13.1	21.5	23.6
N	338	338	306	306	229	229

The results of the equivalent calculations for all variables and the three countries are presented in table 5.9. These results come as a little surprise. For many questions, the mode effects are substantial. Small mode effects are only found for the media involvement questions , the "benefit" question and the questions concerning the possession of goods. Large mode effects have been found for the satisfaction questions, political involvement, and involvement in the EU.

Table 5.8 Mode Differences* between face to face and telephone interviews for the "benefit" variable in three countries in the EB41.Panel

	France	Spain	Belgium
Benefited	0.3	4.3	1.8
Not benefited	-1.4	-0.6	-3.9
DK/No answer	1.0	-3.7	2.1
Adjusted total difference	1.3	4.3	3.9

*Because of rounding errors the sum of positive and negative values is not exactly zero in each column.

Actually, effects are found where they are less expected and not found where they were expected. Let us start with the last point. Because telephone interviews are done without visual aids, it could be expected that questions supported in this way in face to face studies produce the most different results. This, however, is not the case. The media involvement questions are asked with show cards in the face to face interview, but for these questions the deviation tends to be lower than in some attitudinal questions. This could be interpreted as an indication that the respondents do not need help by visual aids in that case. On the other hand questions about rather remote political topics like the European Union should produce higher deviations because here nonattitudes are highly probable and therefore the interviewing mode could affect the responses (Zaller, 1992). However, also in this case these effects are not very strong. For example, for the "benefit" question the mode differences are rather small.

Table 5.9 Mode across 15 variables in three countries: the adjusted total differences

	France	Spain	Belgium
Satisfaction with life	5.3	5.0	16.6
Satisfaction with democracy	9.3	5.4	10.8
Persuade others	3.6	9.9	10.9
Political discussion	3.1	2.2	9.1
News on TV	0.9	4.7	2.3
News daily papers	2.6	5.2	6.9
News on radio	6.9	6.7	2.7
Interest in European politics	7.4	8.6	2.4
Level of EU informedness	6.1	12.0	15.1
Membership in EU	6.0	6.3	7.0
Benefit from EU membership	1.3	4.3	3.9
Colour TV	2.6	1.0	1.7
PC	5.3	4.2	3.1
Two or more cars	2.8	1.5	1.2
Second home	2.0	2.6	0
Mean	4.3	5.3	6.2

On the other hand there are even differences regarding the factual information although real change was impossible between the two waves of the panel. For interpretation purposes an additional piece of information may be helpful: the differences are calculated on the basis of the category of possession of a particular good. The proportion of those who have been

interviewed by telephone and who said that they possessed something asked tends to be higher than in the face to face interviews. Thus there is no evidence that people are hesitating on telephone to tell what they possess.

The largest differences are found for the satisfaction and interest questions. For these questions the differences are considerable. Altogether the results differ from the standard literature on this issue suggesting that the differences due to mode are minor (Groves and Kahn, 1979; de Leeuw and van der Zouwen, 1989; de Leeuw, 1992). Therefore there are good reasons to study this issue further in the next part of the book.

5.5 Nonreponse differences

The nonresponse or organisational differences can not be estimated independently. This would require a design where the same people have been contacted by two different organisations at the same time, a design which is, of course, impossible. But an estimate of the differences due to fieldwork effects can be obtained from the previously presented results on the basis of equation 1.

From the estimates of the total differences, of the coverage and of the mode differences the differences due to nonresponse can be derived applying the formula

$$N = T - C - M.$$

On each category percentage for each question. Table 5.10 demonstrates this using the "benefit" variable in France.

Table 5.10 Nonresponse Differences in the case of France for the "benefit" variable*

	Organisational effect	Total % effect	Coverage effect	Mode % effect
Benefited	4.1	4.3	-0.1	0.3
Not Benefited	-7.1	-7.7	0.7	-1.3
DK / No answer	3.0	3.4	-0.6	1.0
Adjusted total difference	7.1	7.7	-0.7	1.3

*Because of rounding errors the sum of positive and negative values is not exactly zero in each column.

The same calculation can be done for all variables and all three countries. Table 5.11 presents the results of these calculations.

Neglecting the effects on the four demographic variables which tend to be lower than the others, the organisation effects vary from 3.6 to 21.7 percentage points. It seems that the organisational differences lead to differences which clearly are rather large and larger than the other two sources of differences.

Table 5.11 Estimates of the nonresponse or organisational effects across 15 variables in three countries: the adjusted total differences

	France	Spain	Belgium
Satisfaction with life	9.3	21.7	12.7
Satisfaction with democracy	10.4	9.4	13.9
Persuade others	15.8	3.6	8.8
Political discussion	4.2	3.9	16.8
News on TV	4.7	8.4	3.7
News daily papers	10.4	10.2	6.4
News on radio	7.6	7.8	10.5
Interest in European politics	2.9	6.2	7.3
Level of EU informedness	5.7	6.1	9.3
Membership in EU	12.3	9.9	20.2
Benefit from EU membership	7.1	13.6	10.9
Colour TV	6.7	2.2	4.4
PC	5.6	1.7	2.9
Two or more cars	0.6	7.2	5.9
Second home	1.4	0.3	0.6
Mean	6.9	7.4	8.9

It should be pointed out again here that these differences cannot be contributed directly to one of the organisations. Only differences, not the absolute biases caused by one of the organisations or both, can be ascertained. We have even to add that a part of these differences might be due to sampling fluctuation because we can not separate systematic effects of the organisations and effects of the random sampling in each study. On the other hand, it is clear from the data that large differences are found if two different organisations collect data from the same populations with the same mode of data collection and identical questions, since the figures in table 5.11 are corrected for mode effects and for coverage differences.

5.6 Conclusion

Table 5.12 summarises all calculated effects for the different variables in the different countries. It should be noted that the estimates of the different effects are based on calculations over all categories of variables. Due to that the equation 1 does not hold anymore. This equality holds for each category but not necessarily for the sum ignoring the signs. We prefer this presentation because it gives the maximum effect for each factor.

According to the size of the effects a clear rank order can be established. The coverage differences rank lowest with a mean of 1.1 over all countries and all questions. In contrast to the other sources of differences, it unavoidably occurs in telephone interviews, but its effect is rather small. Mode differences are remarkably larger with an average score of 5.2. It cannot be concluded that this is necessarily due to the telephone interviews. It may be that respondents produce more random answers in telephone interviews because the time pressure is stronger and they are not supported by visual aids. But on the other hand interviewers in telephone interviews are more controlled which means that they ask the question more precisely in the way expected than in the uncontrolled face to face interview situation.

Clearly the largest total differences come from the black box of the fieldwork of both survey organisations. The mean differences over topics and countries is 7.7. percentage points.

Concerning the individual variables some patterns can be observed. First of all we see the questions about different possessions have relatively small differences for all components except the question with respect to the ownership of two or more cars. Here especially the nonresponse effects of the different organisations make a difference. Given that the mode effects are relatively small, these variables will not be analysed with respect to mode effects in the next part.

The media involvement variables also display relatively small total differences except for the question about the radio. For the newspapers this is, however, partially true because the different effects compensate each other.

The unification questions on membership and benefit are acceptable with respect to coverage and mode effects but the nonresponse differences caused by the different organisations are very large so that incomparable results are obtained.

The other two EU involvement questions have mode effects which are even larger than the nonresponse effects which does not occur very often.

Finally for the satisfaction question and the political involvement questions the mode effects are especially large in one country (Belgium) while large nonresponse differences occur for many questions.

Overlooking all these results we have to say that the effects differ from question group to question group. This is not surprising because the strength of the effects is always dependent on the strength of the relationship between the error source and the substantive type of variable. The strength of these relationships differ of course from topic to topic and therefore there appear also differences between the differences in results for the different questions.

Nevertheless, it is clear that the coverage error is the smallest problem and that the other two factors can produce quite large differences between studies done with a different mode of data collection or by a different organisation. In general the effects are so large that the results can not be compared. Therefore we will discuss in chapters 10 and 11 procedures to correct for these differences in order at least to make the results comparable. But before this is done we will first give more attention to mode effects as the second largest source of differences. Unfortunately not much can be said about the organisational differences than the remarks which have been make in chapter 2. Therefore we will concentrate in the book further on mode effects and correction for differences between studies in general.

Table 5.12 A summary of all one directional differences in three countries

		Total	Coverage	Mode	Organisation
Satisfaction with life	France	10.9	0.3	5.3	9.3
	Spain	21.9	0.9	5.0	21.7
	Belgium	4.6	2.0	16.6	12.7
Satisfaction with democracy	France	4.9	0.3	9.3	10.4
	Spain	8.8	1.7	5.4	9.4
	Belgium	3.4	0.8	10.8	13.9
Persuade others	France	17.1	0.6	3.6	15.8
	Spain	11.6	0.8	9.9	3.6
	Belgium	7.8	1.6	10.9	8.8
Political discussion	France	1.7	0.7	3.1	4.2
	Spain	6.3	2.1	2.2	3.9
	Belgium	10.4	1.7	9.1	16.8
News on TV	France	6.6	0.9	0.9	4.7
	Spain	3.8	1.1	4.7	8.4
	Belgium	3.8	0.7	2.3	3.7
News daily papers	France	7.8	0.6	2.6	10.4
	Spain	8.1	3.4	5.2	10.2
	Belgium	6.9	1.4	6.9	6.4
News on radio	France	13.8	0.9	6.9	7.6
	Spain	11.2	1.0	6.7	7.8
	Belgium	13.3	1.0	2.7	10.5
Interest in European politics	France	10.5	1.0	7.4	2.9
	Spain	13.8	1.6	8.6	6.2
	Belgium	9.3	2.1	2.4	7.3
Level of EU informedness	France	8.4	0.7	6.1	5.7
	Spain	11.1	1.4	12.0	6.1
	Belgium	11.0	0.7	15.1	9.3
Membership in EU	France	6.7	0.5	6.0	12.3
	Spain	7.0	0.8	6.3	9.9
	Belgium	16.6	2.0	7.0	20.2
Benefit from EU membership	France	7.7	0.6	1.3	7.1
	Spain	14.0	0.7	4.3	13.6
	Belgium	15.1	2.4	3.9	10.9
Colour TV	France	4.1	0	2.6	6.7
	Spain	0.7	0.5	1.0	2.2
	Belgium	2.5	0.2	1.7	4.4
PC	France	0.2	0.5	5.3	5.6
	Spain	7.4	1.5	4.2	1.7
	Belgium	8.4	2.4	3.1	2.9
Two or more cars	France	4.7	1.3	2.8	0.6
	Spain	10.6	1.9	1.5	7.2
	Belgium	9.3	2.2	1.2	5.9
Second home	France	0.8	0.2	2.0	1.4
	Spain	4.9	2.0	2.6	0.3
	Belgium	1.0	0.4	0	0.6
Mean	France	7.1	0.6	4.3	6.9
	Spain	9.4	1.4	5.3	7.4
	Belgium	8.2	1.4	6.2	8.9